

IN THE CLAIMS:

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1. (Currently amended) A method for heat treating an article, comprising the steps of:

providing an article having a nominal composition, in weight percent, of about 4 percent aluminum, about 4 percent molybdenum, about 2 percent tin, about 0.5 percent silicon, balance titanium and impurities;

processing the article to form a martensitic structure therein, the step of processing including the steps of

first heating the article to a first-heating temperature of greater than about 1600°F and in the alpha-plus-beta region of a phase diagram of the article, and thereafter

first cooling the article to a temperature of less than about 800°F; thereafter

second heating the article to a second-heating temperature of from about 1275°F to about 1375°F for a time of from about 1 to about 7 hours; and thereafter

second cooling the article to a temperature of less than about 800°F at a second cooling rate that does not exceed about 15°F per second.

2. (Original) The method of claim 1, wherein the step of providing the article includes the step of

providing the article having a first portion with a thickness of less than 0.2 inch and a second portion with a thickness of greater than 0.2 inch.

3. (Original) The method of claim 1, wherein the step of providing the article includes the step of

providing a gas turbine compressor blade.

4. (Original) The method of claim 1, wherein the step of processing includes the step of

forging the article at the first-heating temperature.

5. (Original) The method of claim 1, wherein the step of processing includes the step of  
forging the article at a temperature of about 1650°F.

6. (Currently amended) ~~The method of claim 1~~ A method for heat treating an article, comprising the steps of:

providing an article having a nominal composition, in weight percent, of about 4 percent aluminum, about 4 percent molybdenum, about 2 percent tin, about 0.5 percent silicon, balance titanium and impurities;

processing the article to form a martensitic structure therein, the step of processing including the steps of

first heating the article to a first-heating temperature of greater than about 1600°F, and thereafter

first cooling the article to a temperature of less than about 800°F, wherein the step of processing includes the step of weld repairing the article at the first-heating temperature; thereafter

second heating the article to a second-heating temperature of from about 1275°F to about 1375°F for a time of from about 1 to about 7 hours; and thereafter

second cooling the article to a temperature of less than about 800°F at a second cooling rate that does not exceed about 15°F per second.

7. (Original) The method of claim 1, wherein the step of second heating includes the step of

second heating to the second-heating temperature of about 1350°F for a time of from about 4 to about 6 hours.

8. (Original) The method of claim 1, wherein the step of second cooling includes the step of

second cooling the article at the second cooling rate of from about 1°F per second to

about 15°F per second.

9. (Original) The method of claim 1, including an additional step, after the step of second cooling, of  
stress relieving the article at a temperature of from about 1000°F to about 1050°F.

10. (Original) The method of claim 1, wherein the step of second heating includes a time of from about 4 to about 6 hours at the second-heating temperature.

11. (Original) The method of claim 1, wherein the step of second heating includes the step of  
wrapping the article in a foil selected from the group consisting of commercially pure titanium foil and tantalum foil.

12. (Currently amended) A method for heat treating an article, comprising the steps of:

providing an article formed of an alpha-beta titanium-base alloy;  
processing the article to form a martensitic structure therein, the step of processing including the steps of

first heating the article to a first-heating temperature of greater than about 1600°F and in the alpha-plus-beta region of a phase diagram of the article, and thereafter

first cooling the article to a temperature of less than about 800°F; thereafter  
second heating the article to a second-heating temperature of from about 1275°F to about 1375°F for a time of from about 1 to about 7 hours; and thereafter

second cooling the article to a temperature of less than about 800°F at a second cooling rate that does not exceed about 15°F per second.

13. (Original) The method of claim 12, wherein the step of providing the article includes the step of  
providing the article formed of the alpha-beta titanium-base alloy having more than

about 3.5 weight percent molybdenum.

14. (Original) The method of claim 12, wherein the step of providing the article includes the step of

providing the article having a first portion with a thickness of less than 0.2 inch and a second portion with a thickness of greater than 0.2 inch.

15. (Original) The method of claim 12, wherein the step of providing an article includes the step of

providing a gas turbine compressor blade.

16. (Original) The method of claim 12, wherein the step of processing includes the step of

forging the article at the first-heating temperature.

17. (Currently amended) ~~The method of claim 12~~ A method for heat treating an article, comprising the steps of:

providing an article formed of an alpha-beta titanium-base alloy;

processing the article to form a martensitic structure therein, the step of processing including the steps of

first heating the article to a first-heating temperature of greater than about 1600°F, and thereafter

first cooling the article to a temperature of less than about 800°F, wherein the step of processing includes the step of weld repairing the article at the first-heating temperature; thereafter

second heating the article to a second-heating temperature of from about 1275°F to about 1375°F for a time of from about 1 to about 7 hours; and thereafter

second cooling the article to a temperature of less than about 800°F at a second cooling rate that does not exceed about 15°F per second.

18. (Original) The method of claim 12, wherein the step of second heating includes the step of  
second heating to the second-heating temperature of about 1350°F for a time of from about 4 to about 6 hours.

19. (Original) The method of claim 12, including an additional step, after the step of second cooling, of  
stress relieving the article at a temperature of from about 1000°F to about 1050°F.

20. (Original) The method of claim 12, wherein the step of second heating includes a time of from about 4 to about 6 hours at the second-heating temperature.

21. (Currently amended) The method of claim ~~17~~ 12, wherein the step of second heating includes the step of  
wrapping the article in a foil selected from the group consisting of commercially pure titanium foil and tantalum foil.

22. (New) A method for heat treating an article, comprising the steps of:  
providing an article formed of an alpha-beta titanium-base alloy and having a first portion with a thickness of less than 0.2 inch and a second portion with a thickness of greater than 0.2 inch;  
processing the article to form a martensitic structure therein, the step of processing including the steps of  
first heating the article to a first-heating temperature of greater than about 1600°F, and thereafter  
first cooling the article to a temperature of less than about 800°F; thereafter  
second heating the article to a second-heating temperature of from about 1275°F to about 1375°F for a time of from about 1 to about 7 hours; and thereafter  
second cooling the article to a temperature of less than about 800°F at a second cooling rate that does not exceed about 15°F per second.

23. (New) A method for heat treating an article, comprising the steps of:  
providing an article formed of an alpha-beta titanium-base alloy;  
processing the article to form a martensitic structure therein, the step of processing  
including the steps of

first heating the article to a first-heating temperature of greater than about  
1600°F, wherein the step of processing includes the step of forging the article at the first-  
heating temperature, and thereafter

first cooling the article to a temperature of less than about 800°F; thereafter  
second heating the article to a second-heating temperature of from about 1275°F to  
about 1375°F for a time of from about 1 to about 7 hours; and thereafter

second cooling the article to a temperature of less than about 800°F at a second  
cooling rate that does not exceed about 15°F per second.

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